

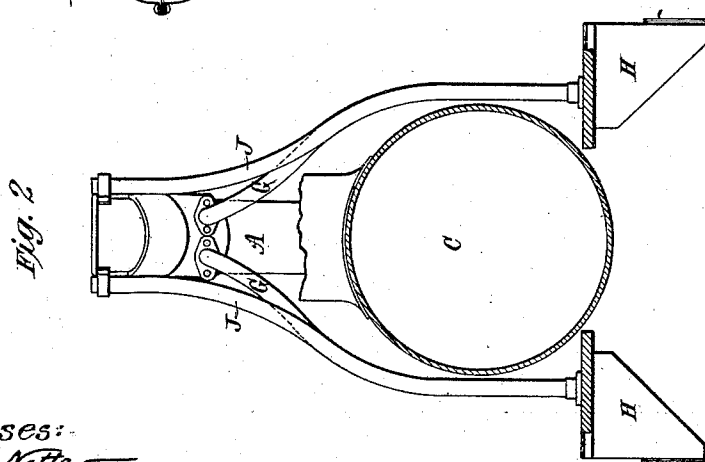
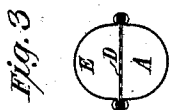
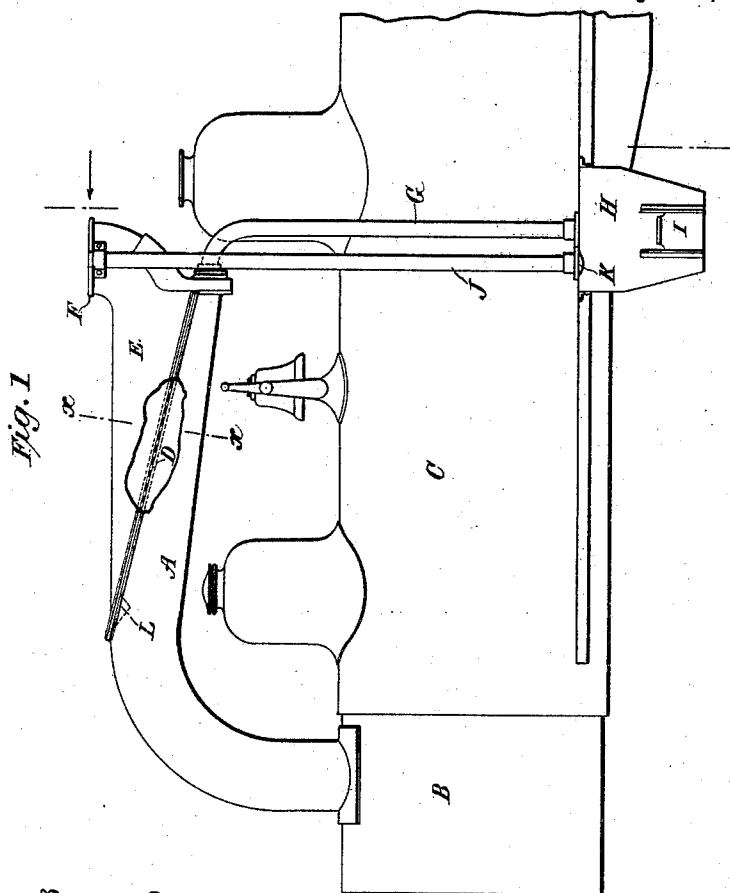
(No Model.)

2 Sheets—Sheet 1.

D. B. STROUSE & W. GRIFFIN.
SPARK ARRESTER.

No. 476,176.

Patented May 31, 1892.



Witnesses:
Raphael Netter
Ernest Hopkinson

Inventors:
Demetrius B. Strouse
Wingfield Griffin
by Dumeau & Page
Attorneys

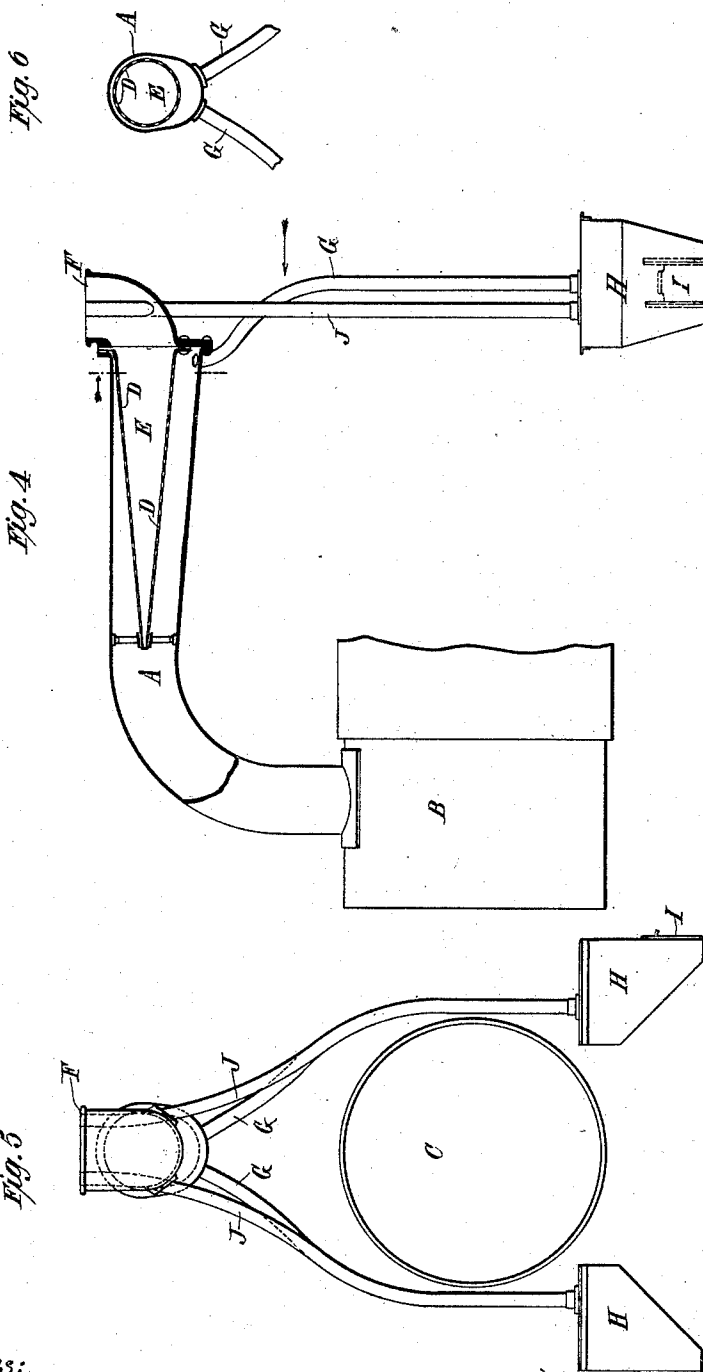
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Wingfield Griffin.
by
Duncan & Page
Attorneys.

UNITED STATES PATENT OFFICE.

DEMETRIUS B. STROUSE AND WINGFIELD GRIFFIN, OF SALEM, VIRGINIA,
ASSIGNORS TO THE CARPER RAILWAY ENGINE COMPANY, OF SAME
PLACE.

SPARK-ARRESTER.

SPECIFICATION forming part of Letters Patent No. 476,176, dated May 31, 1892.

Application filed September 25, 1891. Serial No. 406,816. (No model.)

To all whom it may concern:

Be it known that we, DEMETRIUS B. STROUSE and WINGFIELD GRIFFIN, both of Salem, in the county of Roanoke and State of Virginia, have invented a new and useful Improvement in Spark-Arresters, of which the following is a specification, reference being had to the accompanying drawings.

It is the object of the present invention to provide simple and effective means by which the sparks and cinders generated in steam-locomotives and other engines are separated from the smoke and steam and are deposited and temporarily retained in conveniently-located receptacles, while the smoke and steam are forcibly discharged upwardly into the air, and their liability to envelop the train or vessel, and thereby cause discomfort to the passengers or interference with signaling, is largely avoided.

The invention consists generally in extending the smoke stack or flue backward over the boiler, preferably in nearly a horizontal position, and dividing off from it a smoke-compartment by means of a wire-gauze or other finely-perforated partition extending lengthwise of the flue, which will permit the free passage of smoke and steam, but will prevent the passage of sparks and cinders, and connecting the smoke-compartment with an upwardly-projecting main exhaust-discharge of the engine, while the sparks or cinders are discharged from the bottom part of the flue into receptacles located below the same.

It also consists in connecting the cinder-receptacle with the mouth of the main exhaust-discharge by means of a pipe whose discharge end is located at or in the mouth of the main exhaust-discharge; and it further consists in providing the perforated partition of the flue with a deflector located at or near the beginning of the partition for the purpose of breaking the force of the sparks and cinders and preventing them from coming in direct contact with the partition and from consequently wearing or cutting it out.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a part of a

locomotive to which our improvement is applied, the smoke-stack being broken away to show the perforated partition. Fig. 2 is a rear elevation looking in the direction of the arrow of Fig. 1, certain parts being shown in section. Fig. 3 is a cross-section of the smoke-stack along the line *xx* of Fig. 1. Fig. 4 is a longitudinal section of a smoke-stack and a side elevation of connected parts, showing a modified form of partition and smoke-compartment. Fig. 5 is a rear view of the same, looking in the direction of the arrow of Fig. 4; and Fig. 6 is a cross-section of the smoke-stack and smoke-compartment, showing, also, the cinder-discharge pipes.

In the drawings, A represents a smoke stack or flue of a locomotive connected with the smoke-box B thereof and receiving exhaust-steam and products of combustion in the usual way. This stack is curved backward over the boiler C and preferably occupies nearly a horizontal position.

D is a perforated partition or diaphragm extending lengthwise of the flue A and is made of wire-gauze or other suitable material provided with small openings, which permit the passage of smoke and steam, but not of sparks and cinders. This partition divides off from the main part of the stack or flue, which carries the smoke, sparks, and steam, a smoke-compartment E, which receives the smoke and steam as they pass through the perforations of the partition, and its end nearest the smoke-box B is attached to the upper wall of the flue, while its end farthest from this point is attached to the end of the flue near the bottom wall thereof. To facilitate the insertion of the partition D in place, as well as to enable it to be readily renewed, if desired, the flue is conveniently made in two longitudinal parts or sections, each with flanged edges, and the margin of the partition is clamped between these flanged edges, as shown in Fig. 3 of the drawings, the flanges being secured together by bolts or rivets.

F represents the main exhaust-discharge of the locomotive and is connected directly with the smoke-compartment E and preferably opens into the rear thereof, and its walls are projected upward for the purpose of direct-

ing the smoke and steam high into the air under the force of the exhaust.

The lower portion of the flue A, preferably at or near its rear end, is connected by means of a tube G with a receptacle H; in which the sparks and cinders are deposited and temporarily retained and from which they can be removed from time to time, when desired, through a door I.

As a portion of the smoke and steam will necessarily be forced downward into the receptacle H with the cinders and sparks, it is desirable to discharge any such smoke and steam at such point and in such manner as to prevent it from coming in contact with the locomotive or train and causing inconvenience thereby, and for this purpose a pipe J leads from the cinder-receptacle H to the main exhaust-discharge F, having its open end located in or in close proximity to the mouth of such main discharge, so that the force of the exhaust as it passes upward and out of the pipe F is availed of to draw the smoke and steam from the receptacle H and force them high into the air with the smoke and steam which are forced out directly from the smoke-chamber E. Inasmuch as the bottom of the flue A on which the sparks and cinders are deposited occupies nearly a horizontal direction, the draft thus created through the pipe J by the main exhaust discharge is communicated through the receptacle H and through the pipe G to the flue A and assists to draw the sparks and cinders down the pipe F and keep the flue A clear. K is a perforated cap placed over the lower end of pipe J, where it enters the receptacle H, to prevent the sparks from being drawn up this pipe with the smoke and steam.

To prevent the sparks from striking their full force against the perforated partition D, a deflector L, of steel or some other hard material, is placed at the point where the sparks would otherwise be forcibly thrown against the partition and which operates to receive the impact thereof and slightly to turn their course away from the partition, and thus to prevent the partition from being worn or cut away.

It is understood that the cinder-discharge pipe G and the receptacle H and the pipe J are in practice to be duplicated upon opposite sides of the locomotive, as shown in the drawings. It is also observed that in the construction described the perforated partition extends along the length of the smoke stack or flue and forms the dividing-wall between the smoke-compartment E and the flue A. The nearly-horizontal position of the flue provides that this partition may be continued to such length as to give sufficient perforated surface to largely separate the smoke from the sparks and cinders and allow the smoke under the force of the exhaust to pass directly through the partition and into the smoke-compartment E, which is in length substantially equal to the length of the partition. It is also observed that the main ex-

haust-discharge F, which connects directly with the smoke-compartment, is in its cross-section of much less area than the superficial area of the perforated partition D, in order that the volume of smoke and steam may be largely concentrated near the point of their discharge and will consequently be projected high into the air. This is of great importance, as the partition, in order to operate to most fully separate the smoke from the sparks, must be of an extended area, while the area of the discharge F in cross-section, in order to operate to direct the smoke high into the air under the force of the exhaust, must be largely contracted as compared with the area of the separating-partition.

The modified construction shown in Figs. 4, 5, and 6 varies, mainly, from that above described in locating the smoke-compartment E wholly within the flue A, and this is accomplished by making the perforated partition to surround or inclose a central space within the flue, which space forms the smoke-compartment. As shown in the drawings, the partition D is a hollow cone, which is properly secured in the flue A, but, as will be readily seen, this partition may be of varied shapes and accomplish substantially the same result in the same way. This construction has the advantage of presenting a large separating surface through which the smoke and steam pass under the direct force of the exhaust into and through the smoke-compartment E to the main exhaust-discharge F, which latter is located, as shown in Fig. 4, at the rear of the smoke-compartment. The sparks and cinders fall upon the bottom of the flue A and are discharged through pipes G, as before described.

The operation of this spark-arrester is as follows: As the smoke and sparks from the fire are forced by the exhaust along the extended smoke-stack the greater part of the smoke and steam passes through the perforated partition D, which is interposed in the direct path of the main exhaust, and is forced vertically upward into the air from the main discharge F, while the sparks and cinders are retained in the lower part of the flue A, from which they are forced and drawn down into the cinder-receptacle H by the forcing action of the exhaust and by the draft or suction created through the pipes J and cinder-receptacles H and pipes G by the action of the exhaust upon the exit ends of the pipes J, which are located in or near the mouth of the main exhaust F.

It has been found that, in addition to the perfect separation of the sparks from the smoke and steam and the disposition of the latter in such manner as, under ordinary circumstances, to cause no inconvenience or annoyance to the passengers of a train, another important advantage results from this construction—viz., that under ordinary fast running of the locomotive one exhaust passes into the base of the smoke-stack before the

preceding exhaust has left the main discharge, which condition produces a far more uniform draft upon the fire than is the case with smoke-stacks of common construction, and consequently largely increases the generation of steam without disturbing or "cutting" the fire to the extent of causing waste of fuel or deadening of the fire.

What is claimed as new is—

1. The combination, substantially as described, in a spark-arrester for locomotives, of a smoke stack or flue extending backward over the boiler, a smoke-compartment divided off from the flue by a perforated partition extending lengthwise of the flue, and an upwardly-projecting exhaust-discharge leading from the smoke-compartment and having a cross-section of less extent than the superficial area of the perforated partition.

2. The combination, substantially as described, in a spark-arrester for locomotives, of a smoke stack or flue extending backward over the boiler, a smoke-compartment divided off from the flue by a perforated partition extending lengthwise of the flue, an upwardly-projecting exhaust-discharge leading from the smoke-compartment and having a cross-section of less extent than the superficial area of the perforated partition, and a cinder-receptacle connecting with the bottom of the flue.

3. The combination, substantially as described, in a spark-arrester for locomotives, of a smoke stack or flue extending backward over the boiler, a smoke-compartment divided

off from the flue by a perforated partition extending lengthwise of the flue, an upwardly-projecting contracted exhaust-discharge leading from the smoke-compartment, a cinder-receptacle located below the smoke-stack and connected therewith by a pipe, and a pipe leading from the cinder-receptacle and having its exit at or in the mouth of the main exhaust-discharge.

4. The combination, substantially as described, in a spark-arrester for locomotives, of a smoke stack or flue extending backward over the boiler, a perforated partition extending lengthwise of said flue, having its forward end secured to the upper wall of said flue and provided with a spark-deflector L upon its under side, and a main exhaust-discharge located in the rear of said deflector and upon the opposite side of the said partition.

5. The combination, substantially as described, in a spark-arrester for locomotives, of a smoke stack or flue extending backward over the boiler, a smoke-compartment divided off from the flue by a perforated partition extending lengthwise of the flue and entirely surrounding the smoke-compartment, and an upwardly-projecting exhaust-discharge leading from the rear of the smoke-compartment, for the purpose described.

DEMETRIUS B. STROUSE.
WINGFIELD GRIFFIN.

Witnesses:

N. D. BARNETT,
H. H. PECHIN.